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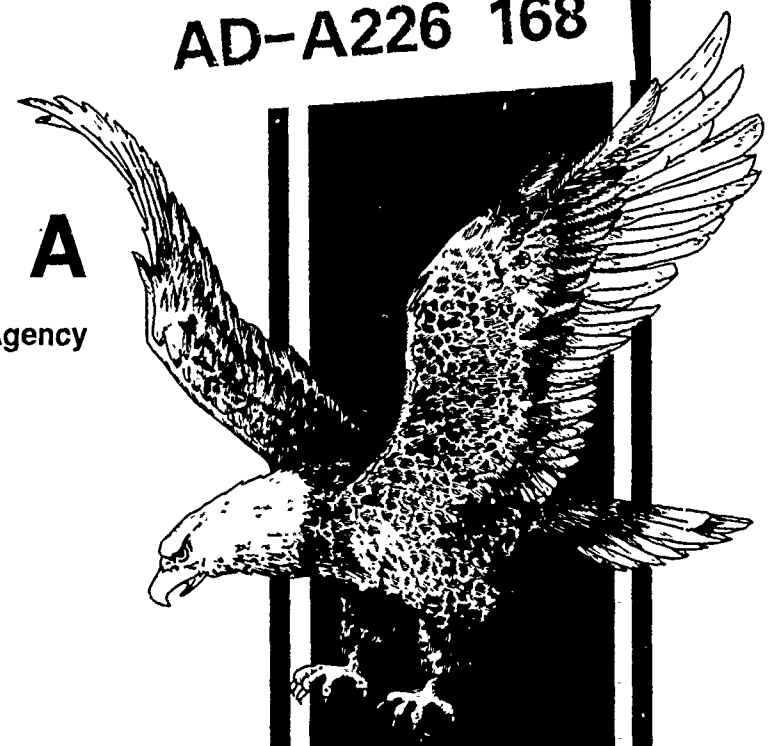

USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

Report of Sampling and Analysis Results

Burlington Army Housing Units
Burlington, Massachusetts

June 1990

Prepared for:

U.S. ARMY TOXIC AND
HAZARDOUS MATERIALS AGENCY
Aberdeen Proving Ground
Maryland 21010-5401

Prepared by:

WESTON
MANAGERS DESIGNERS CONSULTANTS

Under the supervision of:

Environmental Assessment and
Information Sciences Division
Argonne National Laboratory
Argonne, Illinois 60439

NOTICE

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CETHA-BC-CR-90085

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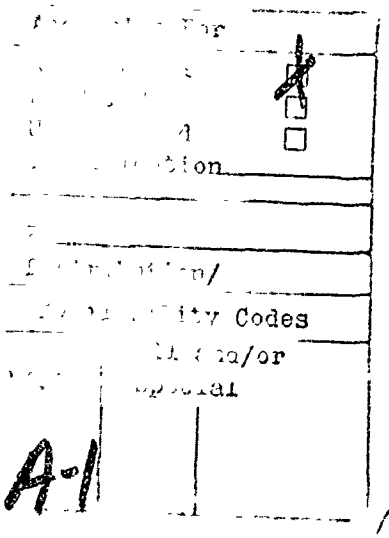

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Roy F. Weston, Inc. has conducted a sampling and analysis program of the Army housing property located in Burlington, Massachusetts. The objectives of this effort include further characterization of environmental contamination identified in an enhanced preliminary assessment carried out in 1989. The specific activities performed at this site were identification, evaluation of the condition, and collection of samples from specific suspected asbestos-containing materials, including floor tiles, pipe run and pipe fitting insulation, dust in the ductwork, and exterior siding, where present. These evaluations were necessary to clarify potential environmental issues identified in the earlier report, prior to the sale or realignment of the property. (53)

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SAMPLING AND ANALYSIS AT THE U.S. ARMY
FAMILY HOUSING UNIT (FHU) PROPERTY
BURLINGTON, MASSACHUSETTS

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EXECUTIVE SUMMARY

The U.S. Army family housing units (FHUs) at Burlington, Massachusetts were inspected by Roy F. Weston, Inc (WESTON) personnel during February 1990 to further evaluate the environmental concerns identified in the enhanced Preliminary Assessment reports prepared and submitted earlier by Argonne National Laboratory (ANL) for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). Three of the 12 single-family "MCA" housing units were examined on 07 February to investigate the possible presence of asbestos-containing materials (ACM).

The ANL Draft Sampling and Analysis Plan, Revision 1 (SAP) specified identifying and sampling the following materials, that frequently are suspected to contain asbestos, from ten per cent of the housing units or a minimum of three, whichever is greater.

- Pipe run insulation.
- Dust accumulated inside heating ductwork within the concrete slab, where present and open.
- Vinyl floor tiles.

The WESTON personnel selected three housing units for inspection after review of maintenance records and drawings, discussions with housing management personnel, and determination that the units were in similar condition. The housing units chosen, Nos. 121, 125, and 131, were considered to be representative of the other nine units, but this was not confirmed by an examination of all the units.

Fourteen samples of vinyl floor tile were collected by WESTON from the three units and analyzed. These analyses revealed that asbestos is present in floor tile at the three housing units examined. Asbestos was quantified at 1% or greater by polarized light microscopy (PLM) in eight samples of the floor tile, and quantified at less than 1% in four samples of the floor tile. Asbestos was qualitatively identified in two other samples by transmission electron microscopy (TEM). No pipe insulation samples were collected since the pipes in the units examined were not insulated. Dust samples were not collected because all floor vents had been permanently sealed. During the asbestos sampling activity, other suspect materials observed were roof shingles and felt.

The following practices should be observed with regard to the known and suspected asbestos-containing materials identified:

- The vinyl floor tiles pose no significant risk as long as they are in good condition and are not damaged by excessive wear or misuse. They should be managed in place under an Operations and Maintenance (O&M) plan which describes procedures for the regular inspection of the floor tiles and the removal and replacement of any that become damaged.

SECTION 1. INTRODUCTION

SAMPLING AND ANALYSIS AT THE U.S. ARMY FAMILY HOUSING UNIT (FHU) PROPERTY BURLINGTON, MASSACHUSETTS

SECTION 1. INTRODUCTION

Roy F. Weston, Inc. (WESTON) was retained by Argonne National Laboratory (ANL) to provide assistance in gathering additional environmental data for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) at 53 family housing unit properties (FHUs) in 12 states. The Burlington, Massachusetts property is one of these FHUs.

1.1 PURPOSE AND SCOPE

The purpose of this project was to provide the Department of the Army with sound environmental data on the property which is scheduled for sale or realignment as a result of the Defense Authorization Amendments and Base Closure and Realignment Act (Public Law 100-526). Environmental assessments of each property covered by the Act are required by the Secretary of Defense prior to their closure or realignment. Such actions must be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA) and to ensure that any environmental hazards will be identified and mitigated where required.

Previously, ANL conducted enhanced preliminary assessments (PAs) for each property. These enhanced PAs made recommendations regarding sampling and analysis to determine (1) whether and in what quantities asbestos is present in certain building construction materials (including pipe run insulation, dust accumulated in heating ductwork, vinyl floor tile, and exterior siding shingles, where present), (2) in selected contexts, whether and in what concentration soils and groundwater may be contaminated, and (3) whether and in what range transformer oils at selected sites may contain polychlorinated biphenyls (PCBs). WESTON gathered this data by implementing Argonne National Laboratory's (ANL's) Draft FHU Sampling and Analysis Plan, Revision 1 (SAP).

1.2 SITE DESCRIPTION

The Department of the Army's FHU property in Burlington, Massachusetts consists of 12 single-family units located on 4.98 acres and situated along Bedford Street. This FHU property is surrounded by private residential properties and a small industrial park.

The units at this FHU property are three-bedroom, single-family dwellings built in 1958 in the "MCA" style. The single-story, wood-frame units were constructed on concrete slab foundations with no basements or crawl spaces. The ducts for the original heating system and the domestic water lines were embedded in the concrete slab, which was covered with vinyl floor tile. The units have pitched roofs surfaced with asphalt shingles and exteriors finished with vinyl siding.

1.3 REPORT ORGANIZATION

This report contains the results of the sampling and analysis program performed by WESTON. Section 2 contains a description of the asbestos sampling performed at the property and laboratory results for samples of suspected asbestos-containing material (ACM) collected. Copies of field notes and laboratory results pertaining to asbestos are provided in Appendices A.1 and A.2.

SECTION 2. ASBESTOS-CONTAINING MATERIALS

SECTION 2. ASBESTOS-CONTAINING MATERIALS

WESTON personnel inspected three of the 12 "MCA" units at the Burlington family housing facility on 07 February 1990 for the presence of suspected ACM. Vinyl floor tiles were the only suspect materials found within the buildings that were sampled. All sampling was done following the requirements of ANL's SAP Additionally, all field work was performed in accordance with applicable Federal regulations, including 40 CFR Part 61 subpart M, 40 CFR Part 763 subpart E, and 29 CFR Part 1910.1001.

2.1 SAMPLING RATIONALE

The sampling rationale used by WESTON for this project followed the recommendations set forth by ANL. The type of suspect ACM to be sampled, the number of housing units to be examined at each FHU facility, and number of samples to be taken for each material found were described in the SAP. The plan for Burlington required sampling of the following materials, if present:

- Pipe run insulation.
- Accumulated dust inside heating ductwork if not sealed.
- Vinyl floor tiles.

In accordance with the SAP, three units were examined at this facility. The sampling plan, however, did not identify specific units which were to be sampled. The task of determining which housing units were representative of the facility as a whole and, therefore, would be sampled was left to the WESTON field team. After reviewing all available maintenance records and drawings and discussing the facility with Directorate of Engineering and Housing (DEH) personnel, it was determined that all of the units at the Burlington FHU were similar in condition. Units 121, 125, and 131, were chosen by the WESTON field team leader as representative units to be sampled.

The SAP specifies that a minimum of two pipe run insulation samples, four dust samples, and one sample of each color of floor tile be collected from each of the housing units examined. Fourteen samples of vinyl floor tile were collected at the facility. No pipe insulation samples were collected since the pipes in the units examined were not insulated. Dust samples were not collected because all floor vents had been permanently sealed. Documentation of the sealed vents was provided by the Army and is included in Appendix A.1.

2.2 FIELD ACTIVITIES AND OBSERVATIONS

Each of the three units was inspected to determine if suspect materials were present. Six colors (white, dark gray, gray, light gray, black, and red) of 9" x 9" vinyl floor tile and one color (brown) of 12" x 12" vinyl floor tile were sampled All three units contained dark gray 9" x 9" floor tile, white 9" x 9" floor tile, and brown 12" x 12" floor tile. In addition, Unit 121 contained red and light gray 9" x 9" floor tiles. Unit 125 contained black 9" x 9" floor tile, and unit 131 contained gray 9" x 9" floor tile. One sample was taken of each of the floor tiles in each housing unit, resulting in a total of 14 samples for laboratory determination of asbestos content. These samples were collected by breaking off a small piece of floor tile in an inconspicuous location. About one square inch of the tile surface area was taken for each sample. No effort was made to separate the mastic, which sometimes contains asbestos, from the floor tile samples themselves.

The vinyl floor tile in all three of the units inspected was in good condition. This material is considered to be a non-friable type of ACM, unless damaged. If significant damage occurs, such that the material becomes friable as defined in the asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP), the U.S. Environmental Protection Agency (EPA) would classify these tiles as friable materials. However, an EPA opinion was recently released that changes certain previous interpretations regarding non-friable ACM. On 23 February 1990, a memorandum was issued by the Director of Emissions Standards Division, the Director of Stationary Source Compliance Division, and the Associate Enforcement Counsel for Air Enforcement of the EPA Office of Air Quality Planning and Standards (OAQPS). This memorandum was circulated to other air quality officials and EPA regional offices in early March 1990. This latest position states that floor tiles and certain other non-friable materials do not have to be removed from a facility prior to demolition, unless they are severely damaged and thus are considered friable, or unless the demolition may cause fiber release through grinding or abrasion of the tiles. Floor tile removal shall be done if demolition is to be accomplished by burning, either of the unit or of the debris from demolition. However, if the floors in the housing units are to be renovated, special care must be taken during the process to prevent the release of asbestos fibers.

The WESTON field team was directed, as a part of the project scope contained in the SAP, to perform sampling and analysis of specific suspect ACM. Other suspect materials observed were roof shingles and felt. Copies of the field notes are included in Appendix A.1.

2.3 LABORATORY PROCEDURES AND RESULTS

The bulk samples of building materials were analyzed for asbestos content by WESTON's optical microscopy laboratory in Auburn, Alabama. This laboratory is accredited by the American Industrial Hygiene Association (AIHA) and the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). The bulk samples were analyzed by Polarized Light Microscopy (PLM) using the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M4-82-020, December 1982. Copies of the laboratory reports are included in Appendix A.2.

Vinyl floor tile samples for which no asbestos was found using PLM methods were analyzed qualitatively for the presence of asbestos by Transmission Electron Microscopy (TEM) at WESTON's NVLAP accredited electron microscopy laboratory in Auburn, Alabama. Copies of these laboratory reports are also included in Appendix A.2.

All analyses were performed in accordance with protocols set forth in the Laboratory Accreditation package submitted by WESTON under NVLAP. This document includes standard procedures for sample analysis and quality assurance/quality control (QA/QC) which were acceptable to NIST. The QA/QC protocols for the laboratory differ significantly from those commonly found in chemical analysis procedures, due to the nature of the analytical procedure. Since there are no reagents, digestions, or other steps in the process that provide significant opportunities for sample contamination or analyte loss, lot blanks and sample spikes are not performed. Instead, all analyses are performed using the following steps:

- Incoming samples are divided into lots of ten for analysis.
- One sample is selected at random to serve as the QC check and divided into two containers.

- The sample lot is assigned to an analyst who determines the asbestos content of each sample.
- The QC sample is analyzed by a different analyst, designated by the sample custodian.
- The results of both analysts are submitted to the QC Coordinator for review, and comparison to the laboratory QC chart.
- The results are reviewed and approved, based on the written QC review procedures, or rejected. If rejected, the sample lot and QC sample are reanalyzed.

The WESTON laboratory routinely runs blank checks to ensure that equipment and refractive index oils are not contaminated, collects and analyzes samples of the air in the work areas to document that airborne asbestos fibers do not threaten worker health or sample contamination, and analyzes samples submitted by NIST to document precision of results as required by the NVLAP program. Samples provided in past rounds of proficiency checks are used for analyst training and to document analyst proficiency. The use of third party laboratory comparisons is often done, and is accomplished by sending duplicates of samples to an outside laboratory and comparing the results obtained by the two facilities.

In interpreting the asbestos results, it should be noted that the definition of asbestos presence differs between the EPA and some state agencies. According to the EPA definition, any materials that contain greater than one per cent (>1%) asbestos are classified as ACM by the 1977 NESHAP regulations. However, California has recently implemented state regulations that consider all materials containing 0.1 per cent (%) or more asbestos as asbestos-containing. It is believed that several other states will soon follow the lead of California in lowering the threshold limit to 0.1 per cent, including some in which properties under review in this study are located. Currently, the State of Massachusetts continues to abide by the EPA definition, hence, all samples containing >1% asbestos are considered to be ACM.

The matter is further complicated by the fact that the PLM method was developed specifically for friable materials, but not for non-friable types of suspect ACM such as vinyl floor tiles, vinyl sheeting, and siding. In fact, no specific method has been developed and promulgated to date for such samples, so laboratories use PLM as the only available documented procedure for their analysis. PLM has an inherent limitation on fiber resolution of about 0.25 micrometer (um) in diameter and reliable detection and quantification of fibers smaller than 1 um in diameter is difficult. The manufacturing process for vinyl floor tiles, for example, results in the very small fiber diameters which often cannot be seen by PLM. WESTON's experience is that frequently such samples do, in fact, contain significant quantities of asbestos. WESTON has developed a qualitative technique using TEM to detect the presence of such small fibers and minimize false negatives in the laboratory results. This technique, however, does not allow a good quantitative estimate of asbestos content.

For these reasons, the WESTON laboratories have implemented a policy of reporting asbestos presence as follows:

- Asbestos determined by PLM to be present at greater than 1% is reported as the quantity detected.

- If asbestos is estimated to be less than 1% by PLM, it is reported as <1%. This estimate of asbestos content may be made when only one asbestos structure is observed.

- If asbestos is not detected in certain non-friable materials by PLM, then the samples are subjected to TEM analysis. The results are reported as positive if asbestos is detected by TEM.

Recommendations made in the report are based on the >1% regulatory limit, except for floor tiles as discussed earlier and except as otherwise noted. However, all samples in which asbestos is observed are discussed. This represents a conservative approach to the assessment of asbestos presence at the facility.

Table 2.1 contains a summary of all samples collected at the Burlington FHU, including sample locations, material descriptions, and laboratory results. PLM results are quantitative while TEM results are qualitative only. Quantity estimates for materials sampled that were suspected to contain asbestos are presented in Table 2.2. The field notes describing the observations are provided in Appendix A.1, while copies of the original laboratory reports are included as Appendix A.2.

Eight samples of the floor tile were found by PLM to contain asbestos greater than the 1% level. WESTON considers the 1% value reported for samples AP-469-22-MA-131-AFT and AP-475-22-MA-125-AFT, and two additional samples which contain this same amount, to be sufficient to define the samples as asbestos-containing due to the analytical uncertainty of the PLM method when applied to floor tiles, as described previously. Four other samples were found by PLM to contain asbestos, but at a concentration of <1%. Two of the samples, for which no asbestos was reported following PLM analysis, were found to contain asbestos fibers by the TEM procedure. While this result is qualitative in nature, consideration of the process through which floor tiles were manufactured leads to the conclusion that this material should be treated as ACM. Thus, all 14 floor tile samples were found to contain asbestos The nine units not inspected should be considered to have ACM present in the floor tiles unless additional sampling and analysis is performed and show that no asbestos is present in these units.

2.4 CONCLUSIONS AND RECOMMENDATIONS

The sample analyses performed by WESTON have revealed that asbestos is present in the vinyl floor tiles in the three units examined. These units are thought to be representative of the other nine at the site, but this was not confirmed by sampling all units.

The vinyl floor tiles in the three housing units inspected were in good condition, but, should they become broken or damaged, asbestos fibers may be released. The recent EPA clarification of the definition for damaged non-friable materials apparently removes some concerns about the status of these materials at the time of renovation or demolition. Inspection of these normally non-friable materials prior to demolition is required, but, if they are in good condition at the time, they may be left in place as long as planned demolition procedures will not release a significant amount of asbestos fibers. However, if demolition will subject these non-friable materials to grinding, sanding, or abrading, or if demolition involves burning of the structure or debris from the structure, all forms of ACM, including these floor tiles, must be removed in advance.

TABLE 2.1
BULK SAMPLE SUMMARY
BURLINGTON FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	ASBESTOS CONTENT PLM ANALYSIS	CONFIRMATION TEM ANALYSIS
Unit 131				
AP468-22-MA-131-AFT	Brown 12" x 12" floor tile	Kitchen	None Detected	Positive
AP469-22-MA-131-AFT	Gray 9" x 9" floor tile	Patch in Utility Room	Chrysotile, 1%	
AP470-22-MA-131-AFT	White 9" x 9" floor tile	Over floor vents	Chrysotile, <1%	
AP471-22-MA-131-AFT	Gray (dark) 9" x 9" floor tile	All rms except kitchen	Chrysotile, 15%	
Unit 125				
AP472-22-MA-125-AFT	Brown 12" x 12" floor tile	Kitchen	Chrysotile, <1%	
AP473-22-MA-125-AFT	Gray (dark) 9" x 9" floor tile	All rms except kitchen	Chrysotile, 15%	
AP474-22-MA-125-AFT	White 9" x 9" floor tile	Over floor vents	Chrysotile, <1%	
AP475-22-MA-125-AFT	Black 9" x 9" floor tile	Patch throughout unit	Chrysotile, 1%	
Unit 121				
AP476-22-MA-121-AFT	Brown 12" x 12" floor tile	Kitchen	None Detected	Positive
AP477-22-MA-121-AFT	Gray (light) 9" x 9" floor tile	Patch throughout unit	Chrysotile, <1%	
AP478-22-MA-121-AFT	White 9" x 9" floor tile	Over floor vents	Chrysotile, 15%	
AP479-22-MA-121-AFT	Red 9" x 9" floor tile	Patch in Kitchen	Chrysotile, 10%	
AP480-22-MA-121-AFT	Gray (dark) 9" x 9" floor tile	All rms except kitchen	Chrysotile, 17%	
AP481-22-MA-121-AFT	Gray 9" x 9" floor tile	Patch throughout unit	Chrysotile, 15%	

TABLE 2.2
ASBESTOS CONTAINING MATEP'
BURLINGTON FAMILY HOU

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	QUANTITY	UNITS
Unit 131				
AP468-22-MA-131-AFT	Brown 12" x 12" floor tile	Kitchen	90	Square ft
AP469-22-MA-131-AFT	Gray 9" x 9" floor tile	Patch in Utility Room	10	Square ft
AP470-22-MA-131-AFT	White 9" x 9" floor tile	Over floor vents	10	Square ft
AP471-22-MA-131-AFT	Gray (dark) 9" x 9" floor tile	All Rms except Kitchen	950	Square ft
Unit 125				
AP472-22-MA-125-AFT	Brown 12" x 12" floor tile	Kitchen	90	Square ft
AP473-22-MA-125-AFT	Gray (dark) 9" x 9" floor tile	All Rms except Kitchen	950	Square ft
AP474-22-MA-125-AFT	White 9" x 9" floor tile	Over floor vents	10	Square ft
AP475-22-MA-125-AFT	Black 9" x 9" floor tile	Patch throughout unit	10	Square ft
Unit 121				
AP476-22-MA-121-AFT	Brown 12" x 12" floor tile	Kitchen	90	Square ft
AP477-22-MA-121-AFT	Gray (light) 9" x 9" floor tile	Patch throughout unit	5	Square ft
AP478-22-MA-121-AFT	White 9" x 9" floor tile	Over floor vents	10	Square ft
AP479-22-MA-121-AFT	Red 9" x 9" floor tile	Patch in Kitchen	5	Square ft
AP480-22-MA-121-AFT	Gray (dark) 9" x 9" floor tile	All Rms except Kitchen	950	Square ft
AP481-22-MA-121-AFT	Gray 9" x 9" floor tile	Patch throughout unit	5	Square ft

The vinyl floor coverings should be left in place and managed under an Operations and Maintenance (O&M) plan. An O&M plan must address the following:

- The locations of all known and suspected ACM.
- The procedures and frequency for periodically assessing the ACM in the facility.
- The procedures for safely handling the ACM during maintenance or removal activities.
- Designation of an asbestos coordinator for the facility.
- The responsibilities and requirements for training of personnel involved with maintenance and renovation of the facility.
- The record-keeping program for the facility.

The vinyl floor tiles should be removed during a planned renovation of the units, in accordance with the regulations applicable at the time.

Other suspect materials noted were roof shingles and felt. Care should be taken during renovations or demolition to identify suspect materials that may have been hidden from the view of the assessment team. The suspect materials observed by the field team, and any hidden suspect materials found later, should be analyzed for the presence of asbestos prior to being disturbed.

APPENDIX A.1. FIELD DATA .

DEPARTMENT OF THE ARMY
HEADQUARTERS FORT DEVENS
FORT DEVENS, MASSACHUSETTS

REPLY TO
ATTENTION OF

01433-5100

February 22, 1990

Directorate of Engineering
and Housing

SUBJECT: Sealing of floor register openings; Off-Post Housing

Roy F. Weston, Incorporated
1635 Pumphrey Avenue
Attention: Mr. Alex Muncie
Auburn, Alabama 36830

Dear Mr. Muncie:

Per our phone conversation of February 20, 1990, I am writing to inform you that we are aware the floor diffuser openings of the Hull, Randolph, Bedford, Nahant and Burlington, Massachusetts housing areas have been sealed with concrete.

Additionally, all of the housing areas in the Conneticut Defense area with the exception of Shelton, have had the floor diffuser openings plugged with concrete.

Sincerely,

for Richard W. Green III
Chief, Design Branch
Engineering, Plans and
Services Division

0105

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. BURLINGTON, 131 SO. BEDFORD ST.

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert Lynch

TECHNICIAN NAME _____ SIGNATURE _____

TIME ARRIVED 1005 TIME DEPARTED 1135 DATE 07/Feb/90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a one story 3 bedroom home with green aluminum siding. The roof has suspect shingles and felt. There is no pipe insulation. The old air duct vents are sealed. There are 4 floor types of floor tile present.

This is an "MCA" style home. It was chosen based upon available drawings, maintenance records, and discussions with housing management personnel.

The actual address is 131 So. Bedford St. Burlington, Ma.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	4
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	0	Exp. Assess. Form Init.	✓

Q.A. Check _____ SIGNATURE _____ DATE __/__/90
dd mmm yy

M:\ADMNFORM\SSL.frm

WESTON

ASBESTOS SURVEY DATA

0107

BLDG. NO.: 131
INSTALLATION 0212

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: BURLINGTON FAMILY HSG
BLDG. DESCRIPTION: NCA STYLE

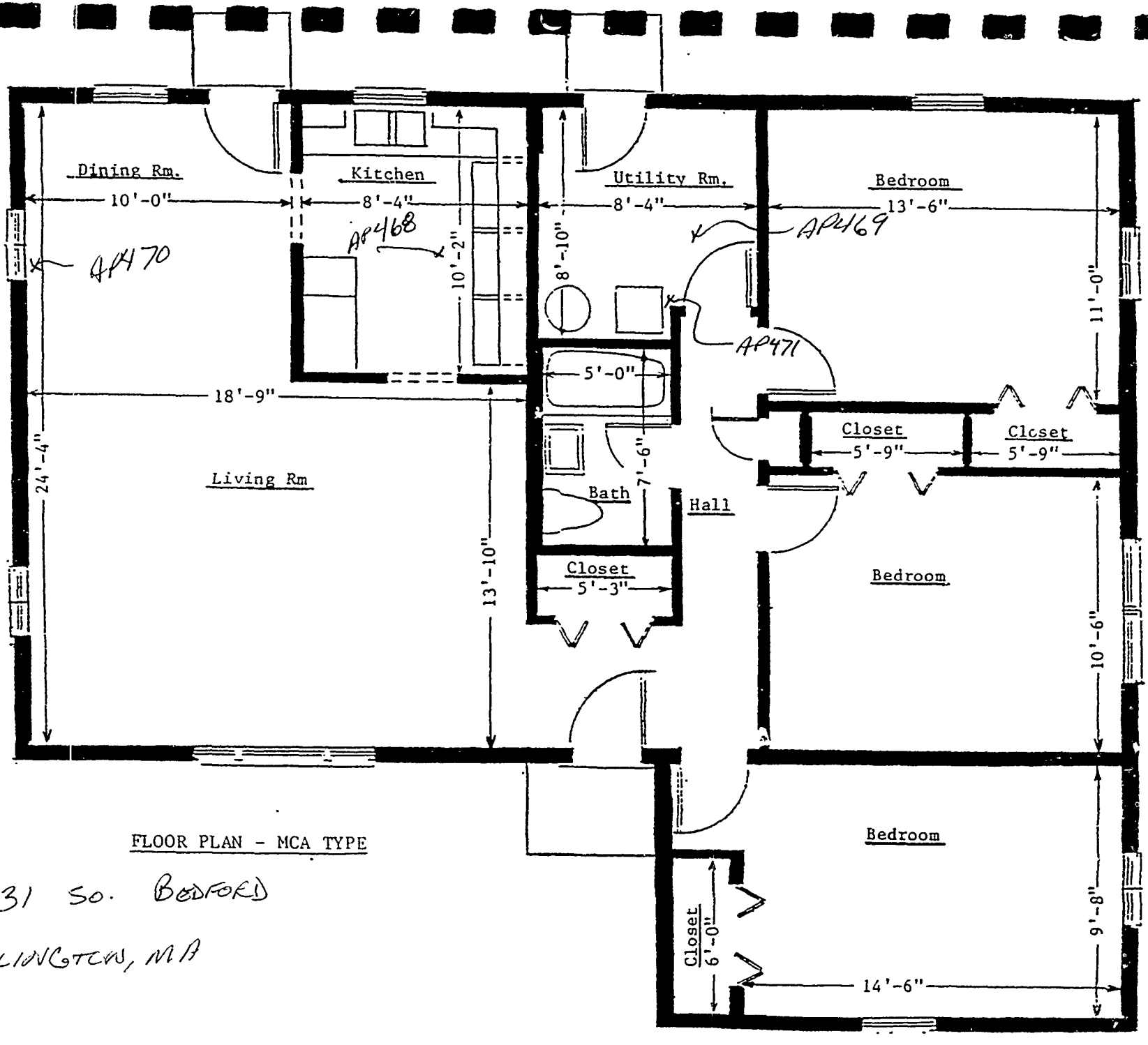
DATE (dd/mm/yy): 07/02/90
TIME ARRIVED: 1105

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AP14608-02-MA-131-AVFT					KITICHEN	90		09B4A	01
2.	AP14609-02-MA-131-AVFT					BATCH	10		09B4B	02
3.	AP14610-02-MA-131-AVFT					OVER VENTS	10		09B4C	03
4.	AP14611-02-MA-131-AVFT					ALL RMS EXCEPT KIT	850		09B4D	04
5.	____-_-_-___-AI__						___		____	_
6.	____-_-_-___-AI__						___		____	_
7.	____-_-_-___-AI__						___		____	_
8.	____-_-_-___-AI__						___		____	_
9.	____-_-_-___-AI__						___		____	_
10.	____-_-_-___-AI__						___		____	_
11.	____-_-_-___-AI__						___		____	_
12.	____-_-_-___-AI__						___		____	_

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	12x12 brown floor tile in kitchen floor.
02	9x9 Grey floor tile, patch in utility room
03	9x9 white floor tile over old floor vents.
04	9x9 Grey (dark) in all rms ~~except~~ except kitchen.

TECHNICIAN SIGNATURE Robert J Lynch

QUALITY ASSURANCE SIGNATURE _____



FLOOR PLAN - MCA TYPE

131 So. Bedford

Burlington, MA

0109

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. Burlington, MA. 125 So. Bedford

FACILITY CONTACT John Grafton TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME Robert Lynch SIGNATURE Robert J Lynch

TECHNICIAN NAME _____ SIGNATURE _____

TIME ARRIVED 1135 TIME DEPARTED 1150 DATE 07/FEB/90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a one story 3 bedroom home with tan aluminum siding. The roof has suspect shingles and felt. There is no pipe insulation. The old air duct vents in the floor are sealed. There are four types of floor tile present.

This is an MCA style home. It was chosen based upon available drawings, maintenance records, and discussions with housing management personnel.

The actual address is 125 So. Bedford Street, Burlington MA.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	4
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	0	Exp. Assess. Form Init.	✓

Q.A. Check _____ SIGNATURE _____ DATE ___/___/90
dd mmm yy

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WESTON

ASBESTOS SURVEY DATA

0111

BLDG. NO.: 1215
INSTALLATION 0212

TASK TEAM MEMBERS
ROBERT LYNCH
STAN HUDGENSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: BUCKINGTON FAMILY HSG
BLDG. DESCRIPTION: MCA STYLE

DATE (dd/mm/yy): 02/02/90
TIME ARRIVED: 1135

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AA9472	212	MA	1215	AIFT	KITCHEN	190		09865A	C1
2.	AA9473	212	MA	1215	AIFT	ALL ROOMS (EXCEPT KIT.)	1950		09865B	02
3.	AA9474	212	MA	1215	AIFT	PATCH	10		09865C	03
4.	AA9475	212	MA	1215	AIFT	PATCH	10		09865D	04
5.					AI					
6.					AI					
7.					AI					
8.					AI					
9.					AI					
10.					AI					
11.					AI					
12.					AI					

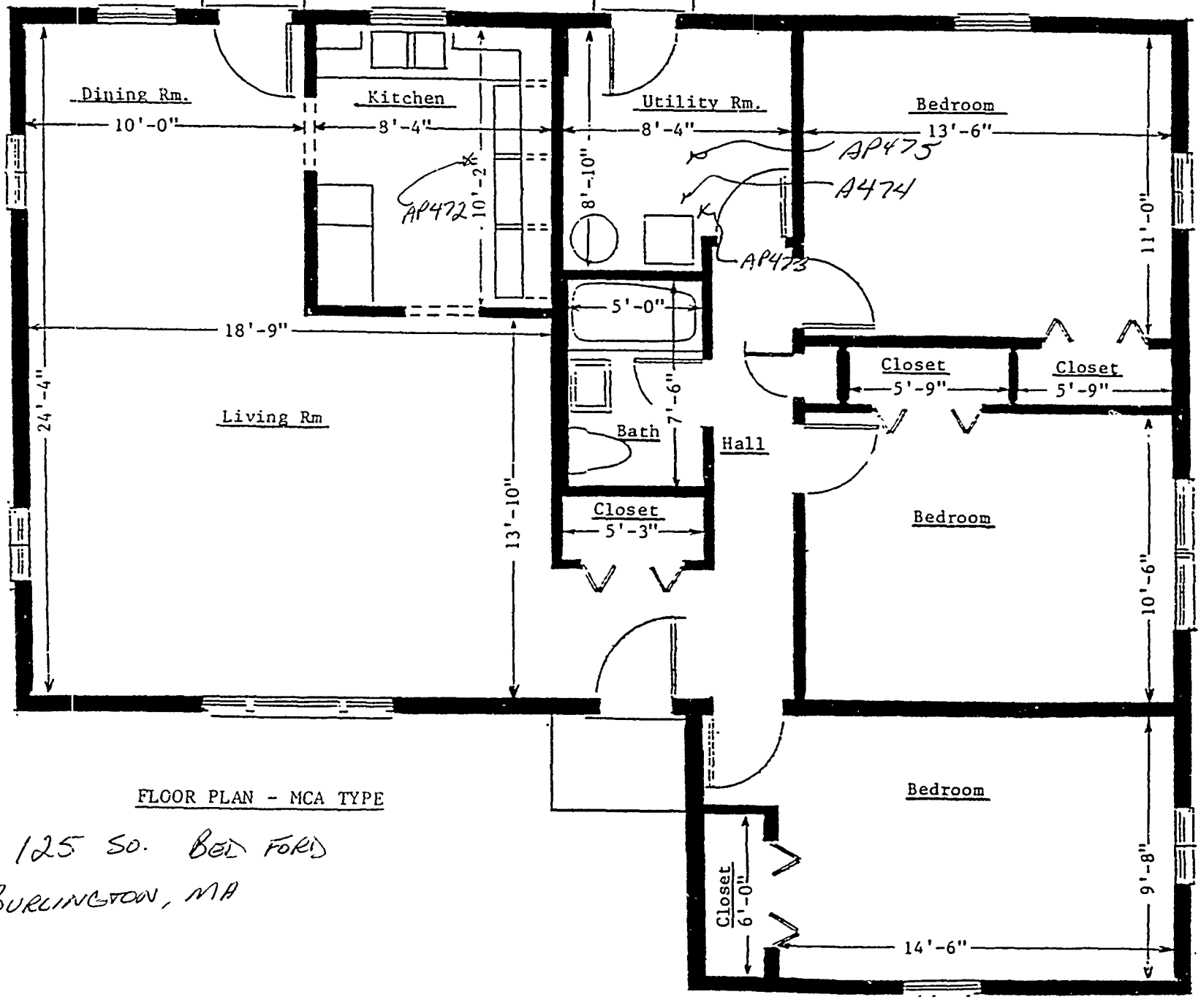
NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	12x12 brown floor tile in kitchen only
02	9x9 dark gray floor tile in all rooms except kitchen.
03	9x9 white floor tile over old floor vents.
04	9x9 black floor tile used to patch areas in home.

TECHNICIAN SIGNATURE Robert Lynch

QUALITY ASSURANCE SIGNATURE

ASDARGON
2-90

ROY F. WESTON, INC



FLOOR PLAN - MCA TYPE

125 So. Bedford

Burlington, MA

0113

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. BURLINGTON, MA 121 SO. BEDFORD.

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert J Lynch

TECHNICIAN NAME _____ SIGNATURE _____

TIME ARRIVED 1150 TIME DEPARTED 1115 DATE 07 FEB 90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a one story 3 bedroom home with tan aluminum siding. The roof has suspect roofing shingles and felt. There is no pipe insulation. The old floor vents have been sealed. There are 6 types of floor tile present.

This is an MCH style home. It was chosen based upon available drawings, maintenance records, and discussions with housing management personnel.

The actual address is 121 So. Bedford street, Burlington, Ma.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	6
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	0	Exp. Assess. Form Init.	✓

Q.A. Check _____ SIGNATURE _____ DATE / /90
dd mmm yy

WESTON

ASBESTOS SURVEY DATA

0115

BLDG. NO.: 1121
INSTALLATION 01212

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: BUCKINGTON FAMILY HSG.
BLDG. DESCRIPTION: MICA STYLE

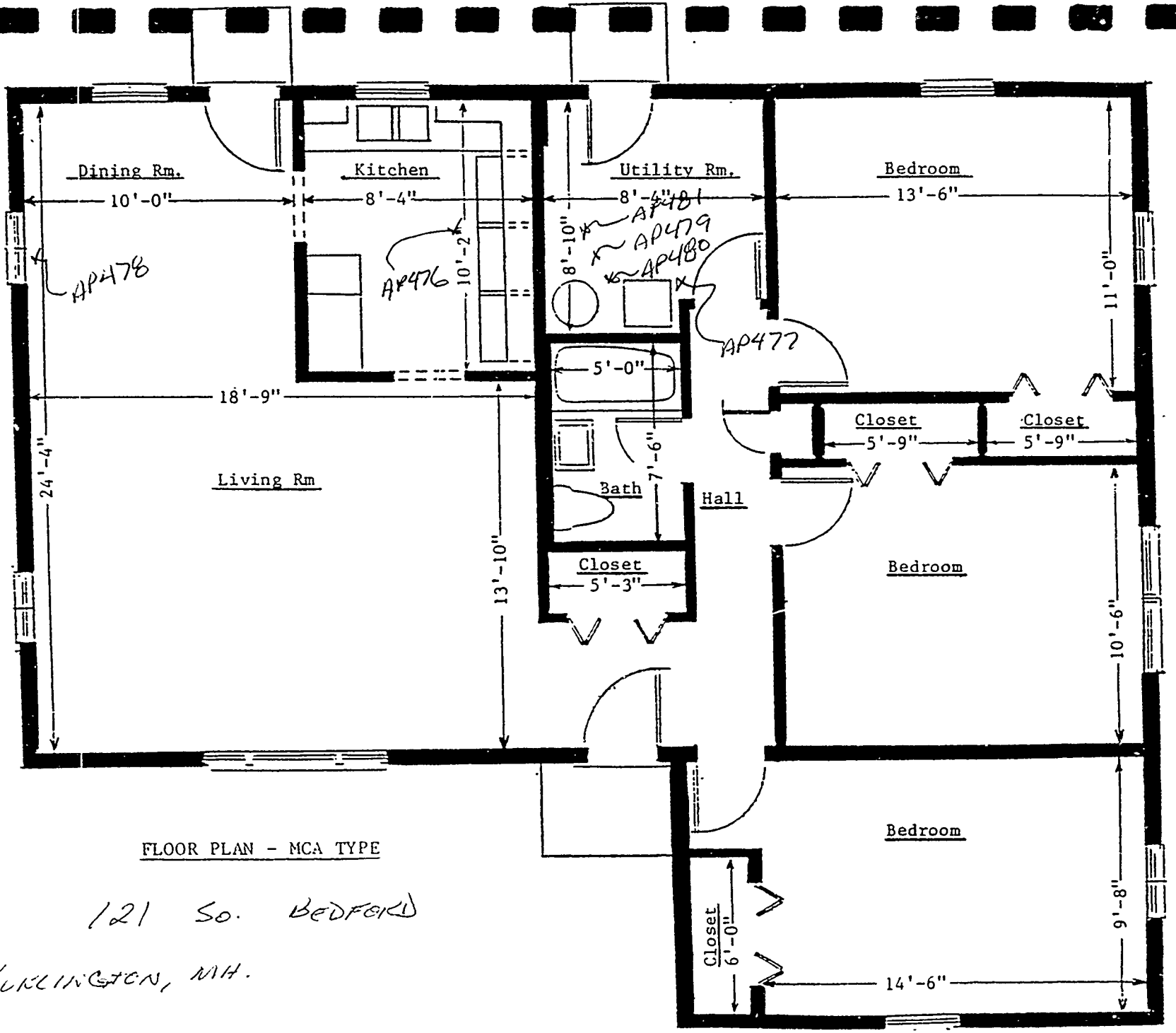
DATE (dd/mm/yy): 02/02/90
TIME ARRIVED: 1150

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AR1426-212-MA-1121-AIFIT					KITCHEN	190		09186A	01
2.	AR1427-212-MA-1121-AIFIT					PATCH	15		09186B	02
3.	AR1428-212-MA-1121-AIFIT					OVER VENTS	10		09186C	03
4.	AR1429-212-MA-1121-AIFIT					PATCH	10		09186D	04
5.	AR1430-212-MA-1121-AIFIT					ALL ITEMS EXCEPT KIT.	950		09186E	05
6.	AR1431-212-MA-1121-AIFIT					PATCH	15		09186F	06
7.	-1-1-1-AI									
8.	-1-1-1-AI									
9.	-1-1-1-AI									
10.	-1-1-1-AI									
11.	-1-1-1-AI									
12.	-1-1-1-AI									

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	12x12 brown floor tile in kitchen only.
02	9x9 lt. grey floor tile, used to patch areas.
03	9x9 white over old floor vents.
04	9x9 red floor tile, patch areas at kitchen area only.
05	9x9 dk. grey floor tile, in all rooms except kitchen.
06	9x9 grey floor tile used to patch areas.

TECHNICIAN SIGNATURE Robert Lynch

QUALITY ASSURANCE SIGNATURE _____



FLOOR PLAN - MCA TYPE

121 So. Bedford

Burlington, MA.

APPENDIX A.2. LABORATORY DATA

BULK SAMPLE ANALYSIS SUMMARY

Weston W.O. No. 2104-13-01-0000

Sample Number AP468 through Sample AP481

AO LAB ID NO	CLIENT/CLIENT ID	LOCATION	MATERIAL DESCRIPTION*	DATE RECEIVED	RESULTS** CH AM CR OT TL	LAYERS	ANALYST
AP468	22-MA-131-AFT	KITCHN	NF, BR, 12X12 FT	02/12/90	ND ND ND ND ND	No	07323
AP469	22-MA-131-AFT	PATCH	NF, GY, 9X9 FT	02/12/90	1 ND ND ND 1	Yes	07323
AP470	22-MA-131-AFT	OVERVE	NF, WH, 9X9 FT	02/12/90	<1 ND ND ND <1	Yes	07323
AP471	22-MA-131-AFT	ALLRMS	NF, GY, 9X9 FT	02/12/90	15 ND ND ND 15	No	07323
AP472	22-MA-125-AFT	KITCHN	NF, BR, 12X12 FT	02/12/90	<1 ND ND ND <1	No	07323
AP473	22-MA-125-AFT	ALLRMS	NF, GY, 9X9 FT	02/12/90	15 ND ND ND 15	No	07323
AP474	22-MA-125-AFT	PATCH	NF, WH, 9X9 FT	02/12/90	<1 ND ND ND <1	Yes	07323
AP475	22-MA-125-AFT	PATCH	NF, BK, 9X9 FT	02/12/90	1 ND ND ND 1	No	07323
AP476	22-MA-121-AFT	KITCHN	NF, BR, 12X12 FT	02/12/90	ND ND ND ND ND	Yes	07323
AP477	22-MA-121-AFT	PATCH	NF, GY, 9X9 FT	02/12/90	<1 ND ND ND <1	Yes	07323
AP478	22-MA-121-AFT	OVERVE	NF, WH, 9X9 FT	02/12/90	15 ND ND ND 15	Yes	07323
AP479	22-MA-121-AFT	PATCH	NF, RD, 9X9 FT	02/12/90	10 ND ND ND 10	Yes	07323
AP480	22-MA-121-AFT	ALLRMS	NF, GY, 9X9 FT	02/12/90	17 ND ND ND 17	Yes	07323
AP481	22-MA-121-AFT	PATCH	NF, GY, 9X9 FT	02/12/90	15 ND ND ND 15	No	07323

* MATERIAL DESCRIPTION

Friable[1], Color[2], System[3], Type

** RESULTS

CH - Chrysotile
AM - Amosite
CR - Crocidolite
OT - Other
TL - Total

FRIABLE[1]

F - Friable
NF - Non-Friable

COLOR[2]

BK - Black
BL - Blue
BR - Brown
GR - Green
GY - Gray
RD - Red
TN - Tan
WH - White
YL - Yellow

SYSTEM[3]

CHW - Chilled Water
DOM - Domestic Water
HHW - Heating Hot Water
STM - Steam
UNK - Unknown

All analyses are performed in accordance with the methods set forth in U.S. EPA 600/M4-82-020, as ammended. Weston's Optical Microscopy Laboratory is accredited by the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program for asbestos fiber analysis (Laboratory Code 1254).

ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

Transmission Electron Microscopy
Asbestos Summary Report

Client: Argonne National Laboratories Weston W.O. No.: 2104-13-01-0000

Sample Type: Floor Tiles Sampling Location: Burlington

QUALITATIVE ANALYSIS

FLOOR TILES: A 0.5 to 2.0 gram portion of each floor tile sample was ultrasonically disaggregated in four milliliters of deionized, 0.2 μm membrane filtered water. After the coarse fraction settled, a drop of the suspended, clay-sized fraction was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined with a Philips CM12 transmission electron microscope operating at 120 kilovolts accelerating voltage.

ANALYTICAL RESULTS

SAMPLE IDENTIFICATION	RESULTS
AP468-22-MA-131-AFT	Positive
AP476-23-MA-121-AFT	Positive

Barry Rayfield
(Approved for Transmittal)

3/13/90
(Date)

* This test report relates only to the specific items tested.
** These sample results may only be reproduced in full, and are valid only if approved for transmittal.